

## SOME AUSTRALIAN STYLODACTYLIDAE (CRUSTACEA: DECAPODA), WITH DESCRIPTIONS OF TWO NEW SPECIES.

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### ABSTRACT

Nine species of Stylodactylidae are reported here from the north-west Australian continental shelf, as well as from the east of the continent (off the Great Barrier Reef). Eight species, including two new species, *Styloactylus brucei* sp. nov. (also collected from Wallis Island) and *S. bathyalis* sp. nov., represent new records for the area. This brings to eleven the number of species of this family now known from Australian waters.

KEYWORDS: Crustacea, Decapoda, Styloactylidae, new species, Australia, Wallis Island.

### INTRODUCTION

As a result of the increase in deep-water research in the last few years in Australia, Dr. A.J. Bruce sent me numerous specimens of the decapod family Styloactylidae for study. These were collected mainly on the north-west continental shelf during expeditions undertaken between 1983 and 1988 by the CSIRO research vessel *Soela* and the fishing vessel *Territory Pearl*, and some collected off the Great Barrier Reef. This new material allowed me to complete the recent revision of the Indo-west Pacific Styloactylidae (Cleva 1990), in which one new genus and nine new species were described.

Nine species have been identified from the recent material received. As far as I know, only one of them, *Styloactylus multidentatus* Kubo, 1942, was previously known from Australia, from off New South Wales (Kensley, Tranter and Griffin 1987: 293). On the other hand, the other two species mentioned by these authors, *Styloactylus libratus* Chace, 1983, and *Parastyloactylus* sp.(= *Parastyloactylus tranterae* Cleva, 1990), are absent from these new collections.

Two new species, *Styloactylus brucei* sp. nov., remarkable for its large size, and *S. bathyalis* sp. nov., from 3502-3515 m depth, the greatest depth the family has been reported, are

described and illustrated. The relationships of *S. brucei* sp. nov. with *S. major* Hayashi and Miyake, 1968, and *S. profundus* Cleva, 1990, are discussed. It should also be noted that *Neostyloactylus investigatoris* (Kemp, 1925), is recorded here for the third time.

The other six species, *Styloactylus multidentatus* Kubo, 1942, *S. licinus* Chace, 1983, *Neostyloactylus amarynthus* (de Man, 1902), *Parastyloactylus bimaxillaris* (Bate, 1888), *P. semblatae* Cleva, 1990, and *Styloactyloides crosnieri* Cleva, 1990, were the subjects of a detailed study in Cleva (1990), consequently, an annotated list is given here, inviting the reader to refer to my paper for further details.

Abbreviations: MNHN (Muséum National d'Histoire Naturelle, Paris), NTM (Northern Territory Museum, Darwin), QM (Queensland Museum, Brisbane).

### SYSTEMATICS

#### Genus *Styloactylus* A.Milne Edwards, 1881

*Styloactylus* A.Milne Edwards, 1881: 11; - Bate 1888: 850; - Hayashi and Miyake 1968: 585; - Figucira 1971: 2, 3 (key); - Chace 1983: 3 (key), 8; - Cleva 1990: 82.

*Stylodactylus brucei* sp. nov.

(Fig. 1A, C-F)

**Type Material.** HOLOTYPE - male, 37 mm, south-west Pacific, Wallis Island, st. CP 638, 13°37'S 179°56'E, 820-840 m, 30 May 1992, MUSORSTOM 7 expedition, MNHN Na. 12121. PARATYPES - 3 males, 38-39 mm, 1 female (ovig.), 41.5 mm, North West Shelf, st. S9, 13°06'S 122°18'E, FV *Territory Pearl*, 900-1000 m, 25 January 1988, B. Wallner coll., NTM Cr.007060; 1 male, 34.5 mm, same station as previous, NTM Cr.007195.

**Other material.** 2 females (1 ovig.), 39-40 mm, same station as previous, NTM Cr.006874; 3 females (ovig.), 40.5-41.5 mm, same station as previous, NTM Cr.007195.

**Description.** The 10 Australian specimens unfortunately have most of their thoracic appendages missing. Luckily, the recent French expedition MUSORSTOM 7, in the south-west Pacific, collected a specimen from Wallis Island, which has retained most of these appendages (only the first and third left pereiopods are missing); as a consequence, this specimen has been designated as the holotype.

In two specimens only, the male paratype 34.5 mm, NTM Cr.007195, and the male paratype 39 mm, NTM Cr.007060, is the rostrum complete (its tip, however, is broken in the latter); it carries 30 dorsal spines (five on the carapace proper), the size of which decrease from the base to the apex, and 33 ventral spines on the former specimen, and 29 dorsal spines (six on the carapace) and 26 ventral spines on the latter (Fig. 1A). The ratio rostrum/carapace lengths are respectively 1.9 and 1.5.

Supraorbital spine absent, antennal and branchiostegal spines present, rather short.

Posterodorsal edge of third abdominal segment with two to four teeth.

Posteroventral margin of fourth segment rounded, margin of fifth ending in sharp point (Fig. 1C).

Telson 1.7 to 1.9 times longer than sixth abdominal segment, ending in long sharp point; dorsal surface with two rows of longitudinal dorsal spines disposed along two distinct carinae, spines variable in numbers; excepting the most distal pair (usually included with two pairs of long terminal spines more ventrally situated), on the nine specimens with an undamaged telson, 4-6, 5-6, 6-6, 7-7, 7-7, 7-8, 7-8, 8-8, and 7-9 spines are present (Fig. 1E).

Eye with well pigmented cornea, slightly wider than ocular peduncle; no secondary cornea.

Antennular peduncle nearly reaching extremity of antennal scale; second segment 1.6 (male) to 1.8 (female) times longer than first (measured dorsally); stylocerite ending in sharp point, slightly exceeding extremity of first article of antennular peduncle (Fig. 1F).

Antennal scale about four times longer than wide, lateral margin unarmed (Fig. 1D).

The following description is of the holotype.

Third maxilliped extending past tip of antennal scale by little more than length of distal segment.

First pereiopod extending past tip of antennal scale by length of chela.

Second pereiopod extending past tip of antennal scale by length of about three-quarters of chela.

Third right pereiopod (most of the left appendage missing) is broken toward middle of merus; remaining part of appendage preserved with the specimen seems to fit with the attached part; merus with three strong lateroventral spines, without dorsodistal spine; propodus three times as long as carpus and 10 times as long as dactyl; dactyl short and strong, with three ventral spinules, measuring about 3.2 mm.

Fourth right pereiopod (left appendage incomplete) overreaching tip of antennal scale by length of dactyl and about three-quarters of propodus; ischium and merus not fused (suture line clearly visible); merus with row of five strong lateroventral spines (eight on the left leg); ischio-merus 4.1 times as long as carpus; propodus 3.1 times as long as carpus and about 12 times as long as dactyl; dactyl short and strong, measuring about 3 mm.

Fifth left pereiopod (right appendage incomplete) extends past tip of antennal scale by length of dactyl and about three-quarters of propodus; ischium and merus not fused; merus with four strong lateroventral spines (five on the right leg) and minute dorsodistal spine remaining on the right leg; ischio-merus about 3.2 times as long as carpus; propodus three times as long as carpus and 15 times as long as dactyl; dactyl short and strong, with 11 ventral spinules, measuring about 3 mm.

**Variation.** The spinulation of the merus of the last three pairs of pereiopods shows some variation; on the few legs still present in the specimens and in place on the body, nine spines are present on the fourth pereiopod, and 11 on the fifth for the female NTM Cr.006874.

**Measurements (mm).** Males with complete rostrum, carapace lengths 34.5 and 39, total lengths from tip of rostrum to extremity of telson, respectively 210 and 220. Carapace length of the largest specimens, 41.5.

**Eggs.** Unusually large in size; in one ovigerous female paratype, 78 eggs still in place, measuring 5.5 to 6.5 mm in length by 4 to 4.5 mm in width. On the other ovigerous females, eggs still in place less numerous.

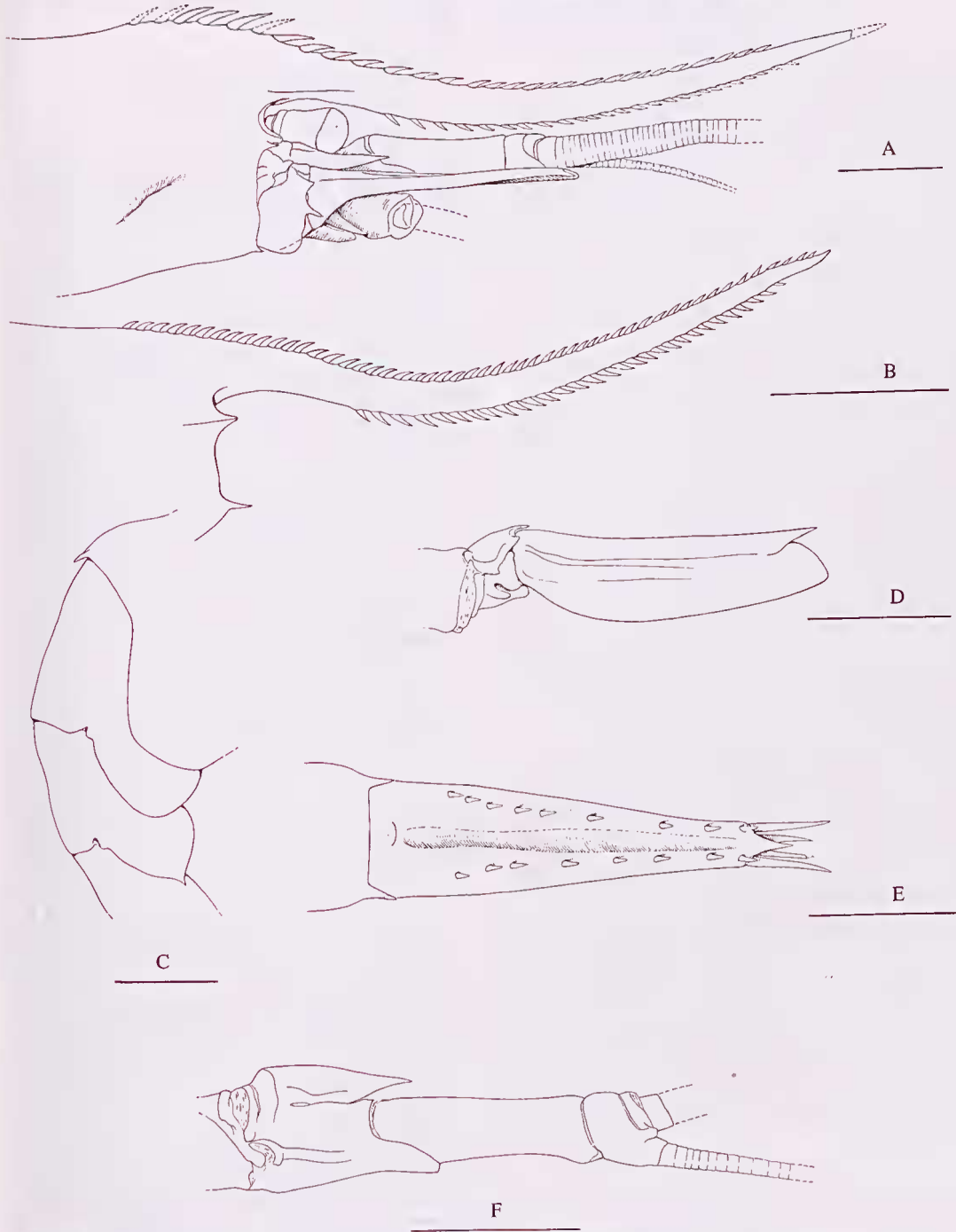


Fig. 1. *Styloactylus brucei* sp. nov.: A, C, male paratype 39 mm (NTM Cr.007060); D-F: other male paratype 39 mm, same station; A, anterior part of cephalothorax; C, fourth and fifth abdominal somites; D, antennal scale; E, telson; F, antennula. B, *Styloactylus major* Hayashi and Miyake, holotype, anterior part of carapace. Scalebar = 10 mm.

**Colouration.** Two Australian specimens (male and female NTM Cr.007195) and the Wallis Island specimen (holotype) have been photographed. The body is entirely red, more or less uniform, with no characteristic pattern visible.

**Etymology.** It is a pleasure for me to dedicate this species to Dr A.J. Bruce, who entrusted the specimens to me for study, and who reviewed and translated the manuscript.

**Systematic position.** *Stylodactylus brucei* shows a close relationship to *S. major* Hayashi and Miyake, 1968. Dr Hayashi kindly sent me the holotype of *S. major* (female, carapace length 28 mm, Zoological Laboratory, Faculty of Agriculture, Kyushu University no. 11129), and a comparison of the two species indicated marked differences, enabling separation by the following characters:

A - Number, aspect and disposition of rostral spines. There are 29-30 dorsal spines and 26-33 ventral spines in *S. brucei* versus 51 and 30 in *S. major*; the proximal dorsal spines of the former are visibly longer than the others, which is not the case in the latter species, where this difference of size is less marked (Fig. 1A-B). The distal part of the rostrum of *S. brucei* is unarmed dorsally, in contrast to *S. major*.

B - The posteroventral margin of the fourth abdominal somite of *S. brucei* is rounded (Fig. 1C), and pointed in *S. major*.

C - The last three pairs of pereopods of *S. brucei* have fewer spines on the merus and the proportions between the articles of these legs are very different from those of *S. major*.

D - *Stylodactylus brucei* is also of a larger size than *S. major* and was collected at a significantly greater depth (820 to 1000 m, compared to 122-124 m).

The shape of the posteroventral margin of the pleura of the fourth and fifth abdominal somites (rounded in fourth and pointed in fifth) brings *S. brucei* closer to *S. profundus* Cleva, 1990, which was previously the only species of the genus with this character (Cleva 1990: 83, 87). *Stylodactylus profundus* may be distinguished from the new species by the following characters.

A - The rostral spines are smaller and homogeneous in size, and more than 46 dorsal spines are present.

B - The rostrum is less curved.

C - The ratio of rostrum/carapace lengths is smaller: 1.2 versus 1.5 to 1.9.

D - The supraorbital spine is present but very small.

E - The telson has five pairs of dorsal spines.

F - The proportions of the articles of the last three pairs of pereopods are very different.

G - It is much smaller in size.

**Distribution.** Northwest Australia, 900-1000m; south-west Pacific, Wallis Island, 820-840m.

*Stylodactylus bathyalis* sp. nov.  
(Fig. 2A-E)

**Material examined.** HOLOTYPE - male, 127 mm, St. 17.1, CIDARIS III, FRV *Franklin*, Coral Sea, Bligh Canyon, 12°23'S 146°08'E, 3515-3502m, 16 February 1992, coll. M. Pichon, A. Birtles and P. Arnold, QM W.13594.

**Description.** Carapace pubescent. Cervical and hepatic grooves well marked. Upper part of branchial region marked by well developed carina. Supraorbital spine absent, antennal and branchiostegal spines present (Fig. 2A).

Rostrum distinctly curved upward, more than 1.7 times longer than the carapace, lacking distal end; proximal portion with 31 dorsal spines, including 10 smaller more regularly placed spines situated on the dorsal margin of carapace proper, anterior to the level of the posterior margin of orbit (post-rostral spines); 21 ventral spines, longer than dorsal spines, most proximal spine situated at level of proximal third of second segment of antennular peduncle (Fig. 2A).

Third to fifth abdominal segments with feeble dorsal carina; with spine at middle of ventral margin of third and fourth pleura, spine slightly more posteriorly on fifth pleuron (Fig. 2B). Sixth segment about 1.7 times longer than fifth. Telson with acutely pointed posterior margin, about 1.7 times longer than sixth segment, about 5.0 times longer than maximum width, dorsal surface with two rows of 10 and 11 small spines along crests of longitudinal carinae (Fig. 2C).

Eyes very small, with cornea reduced, unpigmented, less wide than ocular peduncle. Antennular peduncle exceeding scaphocerite. Scaphocerite reaching to 0.8 of length of second segment of peduncle; first article with distally acute stylocerite, its tip reaching middle of segment length; second segment about same size as proximal; third segment much shorter than lengths of proximal segments, about 0.25 of length (Fig. 2D). Scaphocerite about 4.5 times longer than wide, with very small spines proximolaterally, with larger mobile, distolateral spine, not exceeding anterior border of lamella.

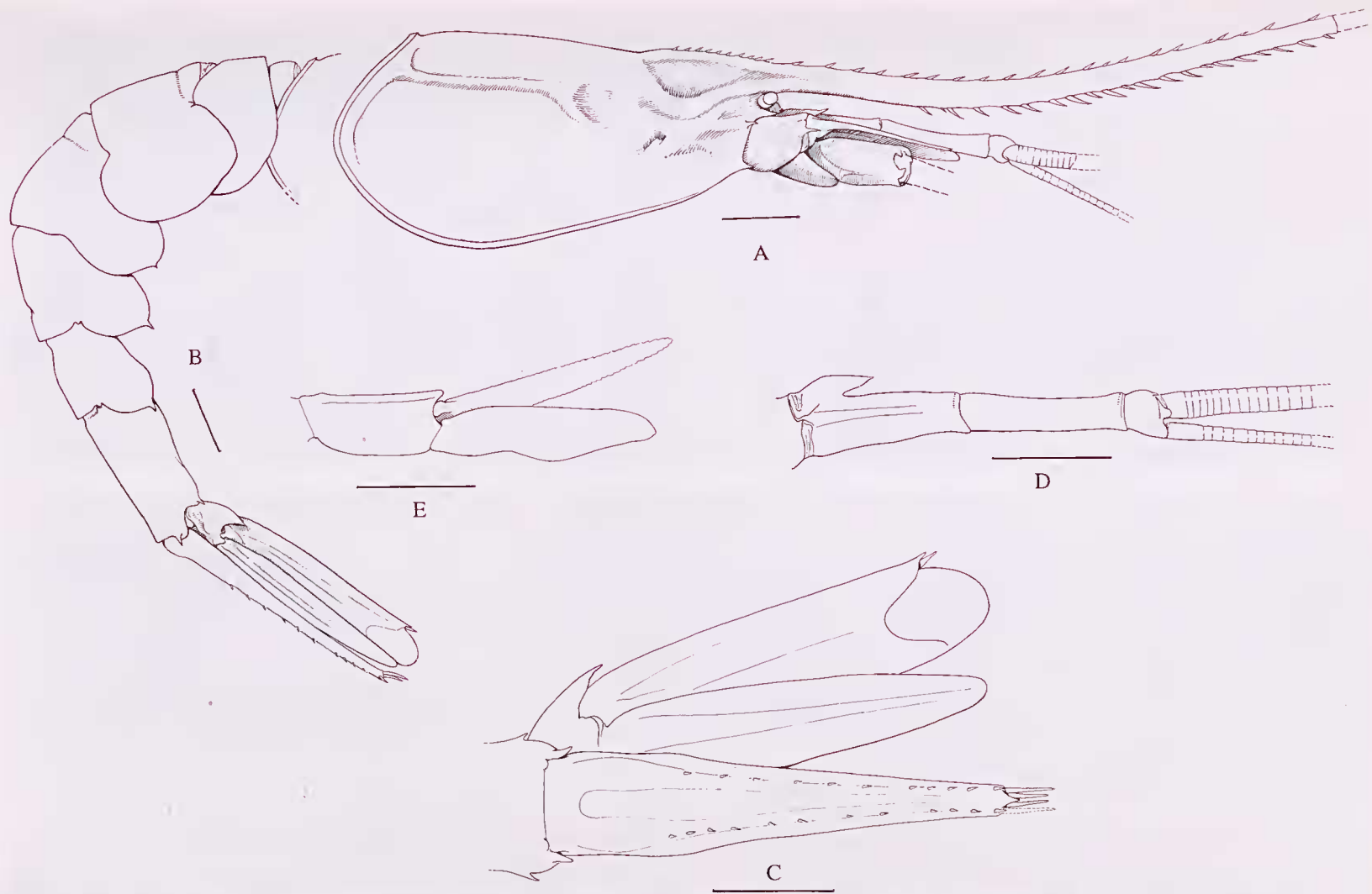


Fig. 2 *Stylo-daecyus bathyalis* sp. nov., male holotype, QM W.13594. A, cephalothorax; B, abdomen and telson; C, telson; D, left antennula; E, first pleopod. Scalebar = 5 mm.

Mandible with well developed palp, with two segments. Second maxillipeds with distoventral segment longer than distodorsal segment. Third maxilliped exceeding tip of scaphocerite by terminal segment and distal third of penultimate segment.

First pereopods with only right pereopod preserved, detached, and probably exceeding scaphocerite by chela and about distal third of carpus.

Second pereopods both preserved, right pereopod still attached, exceeding scaphocerite by chela and about 0.2 of carpus.

Third to fifth pereopods missing or very incomplete, third pereopod represented only by part of left ischiomerus still attached, indicating that distal end of this segment greatly exceeds scaphocerite, with series of strong lateral spines (six on remaining part); fourth pereopod with part of left ischiomerus only, attached, with which may be associated one detached fragment (distal ischiomerus, carpus and part of propod), ischium and merus separated by distinct suture, end of segment distinctly exceeding scaphocerite, with total of 14 mobile lateral spines, in two rows, with three medial spines, one distodorsal spine. Also present one detached pereopod, incomplete, lacking part of propod and dactyl, apparently from left side, probably the left fifth pereopod; ischium and merus separated by distinct suture, merus distinctly smaller than in third and fourth pereopods, exceeding scaphocerite, with 11 lateral spines, two medial spines, one distodorsal spine.

Anterior abdominal sternites without strong median spines.

First pleopod with endopod very well developed (Fig. 2E).

**Measurements.** Total body length 127 mm; postorbital carapace length 23.5 mm.

**Colouration.** Live colour unknown.

**Etymology.** The term "*bathyalis*" indicates the deep-sea habitat of this new species.

**Distribution.** North-east Australia, Coral Sea, 3502-3515 m.

**Remarks.** On account of the characteristics of its minute and unpigmented eyes, and last three pairs of legs which, though unfortunately incomplete, appear to be thin and very long, this new species of the genus *Stylodactylus* can not be confused with any other species. The depth of capture, which exceeds by far that previously known for the genus (1618-1740 m for *Stylodactylus profundus* Cleva, 1990, described

from New Caledonia) accounts, without doubt, for its peculiarities.

### *Stylodactylus licinus* Chace, 1983

*Stylodactylus licinus* Chace, 1983: 14, fig. 6. - Hayashi in Baba, Hayashi and Toriyama 1986: 93, fig. 52 (colour photograph); - Cleva 1990: 87, fig. 3a-j, 18f, g; - Hayashi 1991: 41.

*Stylodactylus tokarensis* Zarenkov, 1968: 58 (*pro parte*), fig. 2 (third pereopod) and fig. 3 (other drawings of fig. 2 are of *Stylodactylus tokarensis* Zarenkov, 1968).

*Stylodactylus stebbingi* - Toriyama and Hayashi 1982: 90, 92, 95, 105 (*nec* Hayashi and Miyake, 1968, *vide* Hayashi in Baba, Hayashi and Toriyama 1986: 93); - King 1984: 178, 179 (fig.), 181; - King 1986: 12, fig. 9 (*nec* Hayashi and Miyake, 1968).

**Material examined.** 1 female, 17 mm, North West Shelf, FRV *Soela*, st. 91, 18° 36.1'S 117°16.6'E, 472 m, 16 August 1983, T. Davis coll., NTM Cr.000543. 1 female (ovig.), 16 mm, FRV *Soela*, st. 16, 18°37.45'E 117°02.4'E, 504-508 m, 31 January 1984, T. Ward coll., NTM Cr.004222. 1 male, 12 mm, 1 female (ovig.), 11 mm, FRV *Soela*, st. 51, 18°06.8'S 118°06.0'E, 448 m, 2 February 1984, A.J. Bruce coll., NTM Cr.001186. 1 female (ovig.), 13 mm, FRV *Soela*, st. 0184-33, 17°30.5'S 118°41.9'E, 505 m, 3 February 1984, T. Ward coll., NTM Cr.006877. 1 male, 9.5 mm, FRV *Soela*, st. 57, 17°13.1'S 118°28.9'E, 504-506 m, 3 February 1984, A.J. Bruce coll., NTM Cr.000707. 1 male, 8.5 mm, 1 female (ovig.), 12.5 mm, FRV *Soela*, st. 45, 16°24.0'S 120°20.4'E, 452-456 m, 5 February 1984, T. Ward coll., NTM Cr.004221. 1 male, 13 mm, 1 female (ovig.), 13 mm, FRV *Soela*, st. 67, 16°18.1'S 120°18.7'E, 496-500 m, 5 February 1984, A.J. Bruce coll., NTM Cr.001184. 2 males, 14.0-14.5 mm, FRV *Soela*, st. 0184-85, 14°52.9'S 121°40.8'E, 222 m, 16 February 1984, T. Ward coll., NTM Cr.006884 and Cr.003032. 1 female (ovig.), 15 mm, North West Shelf, FV *Territory Pearl*, st. 57, 13°26'S 122°21'E, 470-540 m, 25 January 1988, B. Wallner coll., NTM Cr.007058. 1 female (ovig.), 16 mm, and 2 females (ovig.) 12.5-13 mm, FV *Territory Pearl*, st. 59, 13°06'S 122°18'E, 900-1000 m, 25 January 1988, B. Wallner coll., NTM Cr.007059 and Cr.006873. 1 female (ovig.), 14 mm, off Great Barrier Reef, FRV *Soela*, st. 0685-36, 19°58.6'S 150°31.1'E, 879-886 m, 24 November 1985, NTM Cr.006883.

The individual variation noted in the six males and 11 females here identified as *S. licinus* complete and expand that already observed from the material from the Philippines and New Caledonia area (Cleva 1990: 88, 95). The variations concern mostly the relative length of the rostrum and the rostral formula. In the female NTM Cr.000543, the largest specimen known, the rostrum/carapace ratio does not reach 1.4; the rostrum of the male NTM Cr.001184 has 33 dorsal spines and only 12 ventral, the lowest numbers observed so far for this species.

**Distribution.** *Styloactylus licinus* is known from the Philippines (550-970 m), New Caledonia (780 m), the Chesterfield Islands (650-970 m), and Fiji (494 m). Hayashi (1986) reported it from Japan (Tosa Bay, 432 m), and recently (1991) from off Kagoshima, southern Kyushu, at 808-826 m. It is recorded here for the first time from Australia, where it was collected between 222 and 1000 m, minimal and maximal depths for the species, indicating a wide bathymetric distribution.

*Styloactylus multidentatus multidentatus*  
Kubo, 1942

*Styloactylus multidentatus* Kubo, 1942: 34, fig.4, 5; - Hayashi and Miyake 1968: 586, fig.1; Miyake 1982: 26, pl.9, fig.5 (colour photograph); - Chace 1983: 11 (key), 20, fig. 8a-o; - Chan and Yu 1985: 290, pl. I E, F (colour photographs); - Hayashi in Baba, Hayashi and Toriyama 1986: 93, fig.53 (colour photograph); - Kensley, Tranter and Griffin 1987: 293.

*Styloactylus multidentatus multidentatus* - Cleva 1990: 100, fig.7, 8h-m.

*Styloactylus discissipes* - Balss 1933: 84 (nec Bate, 1888).

*Styloactylus bimaxillaris* - Miyake 1982: pl. 9, fig. 4 (nec Bate, 1888).

*Styloactylus brevidactylus* - Cleva 1990: 106, fig. 8a-g.

**Material examined.** 5 females (ovig.), 18-20 mm, North West Shelf, FRV *Soela*, st. 35, 19°19.2'S 115°41.6'E, 348-352 m, 29 January 1984, A.J. Bruce coll., NTM Cr.001183. 2 males, 16.5-19.0 mm, FRV *Soela*, st. 0184-20, 18°55.0'S 117°05.5'E, 296 m, 31 January 1984, T. Ward coll., NTM Cr.006879. 1 male, 19 mm; 4 females (ovig.), 14.0-18.5 mm, FRV *Soela*, st. 45, 18°55.0'S 117°05.5'E, 298-294 m, 31 January 1984, T. Davis coll., NTM Cr.000711. 15 males, 12.5-18.5 mm; 14 females (9 ovig.), 13-18 mm, FRV *Soela*, st.

0184-29, 18°10.15'S 118°14.4'E, 302 m, 2 February 1984, T. Ward coll., NTM Cr.006875. 1 female (ovig.), 15 mm, FRV *Soela*, st. 0184-66, 14°28.9'S 122°01.8'E, 300 m, 12 February 1984, T. Ward coll., NTM Cr.006882. 1 female (ovig.), 15 mm, FRV *Soela*, st. 0184-74, 14°15'S 122°36.3'E, 302 m, 14 February 1984, T. Ward coll., NTM Cr.006880. 2 females (1 ovig.), 11.0-14.5 mm, off Great Barrier Reef, FRV *Soela*, st. 0685-03, 22°34.8'S 153°38.7'E, 314-319 m, 16 November 1985, NTM Cr.006886. 1 female, 19 mm, FRV *Soela*, st. 0685-12, 22°55.1'S 153°00.5'E, 338-325 m, 18 November 1985, NTM Cr.006881. 2 females, 15-16 (ovig.) mm, FRV *Soela*, st. 0685-16, 22°10.55'S 153°30.3'E, 344-325 m, 19 November 1985, NTM Cr.006876. 3 males, 17.5-18.5 mm; 1 female (ovig.), 20 mm, FRV *Soela*, st. 0685-19, 21°32.25'S 152°58.3'E, 237-247 m, 20 November 1985, NTM Cr.006878. 1 female (ovig.), 12 mm, FRV *Soela*, st. 0685-21, 21°27.8'S 153°28.3'E, 412-403 m, 21 November 1985, NTM Cr.006888. 2 females, 10.5-12.5 mm, FRV *Soela*, st. 0685-24, 20°46.4'S 152°35.5'E, 350-362 m, 22 November 1985, NTM Cr.006887. 3 females (1 ovig.), 18.0-19.5 mm, Timor Sea, 9°46'S 129°54'E, 298 m, 22 September 1987, NT Fisheries coll., NTM Cr.006135. 3 females (ovig.), 19.0-21.5 mm, Arafura Sea, 9°46'S 130°00'E, 244-300 m, November-December 1987, T. Bradley coll., NTM Cr.006223. 1 male, 18 mm; 1 female (ovig.), 18.5 mm, FV *Territory Pearl*, st. A2, 9°49'S 130°07'E, 260-280 m, 16 January 1988, B. Wallner coll., NTM Cr.007057.

Sixty-three specimens (22 males and 41 females, 29 ovigerous) are here identified as *Styloactylus multidentatus* Kubo, 1942. This species, widely distributed throughout the Indo-Pacific, seems to exhibit geographical variation, as established for the Malagasian populations, elevated to the sub-species *Styloactylus multidentatus robustus* Cleva, 1990. This could be investigated more thoroughly for the populations of New Caledonia (Cleva 1990: 105 and 104).

On the other hand, after considering the variability recently observed in 45 specimens of *S. multidentatus multidentatus* Cleva, collected from the Moluccas in 1991 during the French-Indonesian KARUBAR expedition, I have decided to synonymise *Styloactylus brevidactylus* Cleva, 1990, with *S. multidentatus multidentatus*.

The Australian specimens seem to belong to the nominal sub-species; the individual variations observed closely resemble those noted in

the Philippine material from the MUSORSTOM expeditions (Cleva 1990: 101). It is worth noting that the rostrum/carapace ratio varies between 1 and 1.25, just a bit more than in the Philippines specimens.

**Distribution.** Common in a wide area of the Indo-West Pacific (Cleva 1990: 105), this species has also been reported from eastern Australia (New South Wales: Kensley, Tranter and Griffin 1987: 293), where it was collected at 356 m. These new collections occurred between 237 and 412 m.

### Genus *Neostylodactylus* Hayashi and Miyake, 1968

*Neostylodactylus* Hayashi and Miyake, 1968: 602; - Figueira 1971: 2-3 (key); - Chace 1983: 4; - Cleva, 1990: 110.

Two species of the genus *Neostylodactylus*, *N. amarynthi* (de Man, 1902), and *N. investigatoris* (Kemp, 1925), were identified in the Australian material. The large number of specimens in the first species (11 males and 29 females) makes it possible to confirm the sexual dimorphism of the branchial formula, reported initially by Chace (1983: 6): absence in the females, unlike the males, of arthrobranchs on pereopods 1 to 4. Nevertheless, two females out of 29 (2.5 and 3 mm, NTM Cr.007196) possess well developed arthrobranchs on pereopods 1 to 4, on both sides.

These observations reveal some exceptions to this surprising dimorphism, which has also been reported in *N. affinis* Hayashi and Miyake, 1968 (Cleva 1990: 111).

The new data obtained from this additional material leads me to modify the key for the identification of the species of the genus proposed in the revision of the family (Cleva 1990: 112).

#### Key to species of the genus *Neostylodactylus*

- 1a. Rostrum with two or more ventral spines; abdominal pleura with one or more marginal denticles, at least on fourth and fifth somites ..... 2
- b. Rostrum unarmed ventrally; pleura of first five abdominal somites without marginal denticles. .... 3
- 2a. Pleura of all abdominal somites with marginal denticles; sixth abdominal somite with one strong lateroventral spine situated in

the centre; telson usually with five pairs of dorsal spines; lateral spinules of antennal scale well developed; endopodite of uropods with well developed proximolateral lobe .

- ..... *N. amarynthi* (de Man, 1902)
- b. Pleura of first two abdominal somites without marginal denticles; sixth abdominal somite without spine in centre; spinules of antennal scale minute; endopodite of uropods without well developed proximolateral lobe ..... *N. affinis* Hayashi and Miyake, 1968
- 3a. Telson with three pairs of dorsal spines; eye provided with secondary cornea ("ocellus"); dactyls of last three pairs of pereopods slender, those of third between 2.2 and 2.8 times shorter than propodus ..... *N. investigatoris* (Kemp, 1925)
- b. Telson with five pairs of dorsal spines; eye without secondary cornea; dactyls of third to fifth pereopods short and robust, those of third about 4.5 times shorter than the propodus ..... *N. sibogae* (de Man, 1918)

#### *Neostylodactylus amarynthi* (de Man, 1902) (Fig. 3)

*Stylodactylus* sp. (*amarynthi*) de Man, 1902: 897, pl. 27, fig. 64a-b.

*Stylodactylus Amarynthi* - De Man 1920: 32, pl.5, fig. 9a-h.

*Stylodactylus amarynthi* - Kemp 1925: 258; - Holthuis 1955: fig. 12.

*Neostylodactylus amarynthi* - Hayashi and Miyake 1968: 603, fig. 6; - Chace 1983: 4, fig. 1-3; - Cleva 1990: 112.

**Material examined.** 5 males, 2.5-3.0 mm, North West Shelf, FRV *Soela*, st. 0183-B04, 19°05.1'S 118°53.4'E, 83 m, 15 February 1983, T. Ward coll., NTM Cr.006889. 5 females (3 ovig.), 2-3 mm, same data, NTM Cr.006890. 2 females, 1.5 mm, FRV *Soela*, st. 0283-B06, 19°04.5'S 118°47.3'E, 83 m, 27 April 1983, NTM Cr.006893. 7 females, 1.5-2.5 mm, same data, NTM Cr.006894. 1 male, 3 mm, FRV *Soela*, st. 0283-B06, 19°04.5'S 118°47.8'E, 82 m, 28 April 1983, NTM Cr.006892. 2 males, 2-3 mm; 7 females, 1.5-2.5 mm, FRV *Soela*, st. 0283-B10, 19°05.0'S 118°57.2'E, 83 m, 28 April 1983, NTM Cr.006895. 1 female, 3 mm, FRV *Soela*, st. 0483-B02, 19°56.3'S 117°53.9'E, 44 m, 26 August 1983, NTM Cr.006898. 3 males, 1.8-2.5 mm; 7 females (1 ovig.), 1.5-3.0 mm, FRV *Soela*, st. 0583-D04, 19°29.6'S 118°52.2'E, 36-38 m, 25 October 1983, NTM Cr.007196.



The rostrum carries 9-24 dorsal spines (including postrostral spines) and 2-7 ventral spines; the lowest numbers refer to the smallest specimens.

Of the 35 specimens with an intact telson, 24 bear five pairs of dorsal spines, four others four pairs, two others five and four spines, two others four and three, and three others 5-6, 5-7, and 3-3 spines. Among the 11 specimens showing an unusual number of spines, eight have a carapace length less than 2 mm.

The presence of two fixed spines on the distolateral extremity of the exopodite of the uropods is not constant; most often, only one is present (the more external one), the second one then being absent or barely noticeable. This can be observed especially in small specimens (carapace length equal to or less than 2 mm), which would seem to show that the second fixed spine develops with the growth of the animal. The same applies to the suture line between the ischium and merus of the fifth pereiopods, which is rarely clearly visible.

The sexual dimorphism also affects the shape of the abdominal pleura, as evidenced in Figures 3A and 3B. This dimorphism is, however, less marked in small or very small specimens.

**Distribution.** Reunion, Andaman Islands, Indonesia, Philippines and Japan, between 9 and more than 120 m (Cleva 1990: 113); this species is now known from north-west Australia, where it was collected between 36-38 and 83 m.

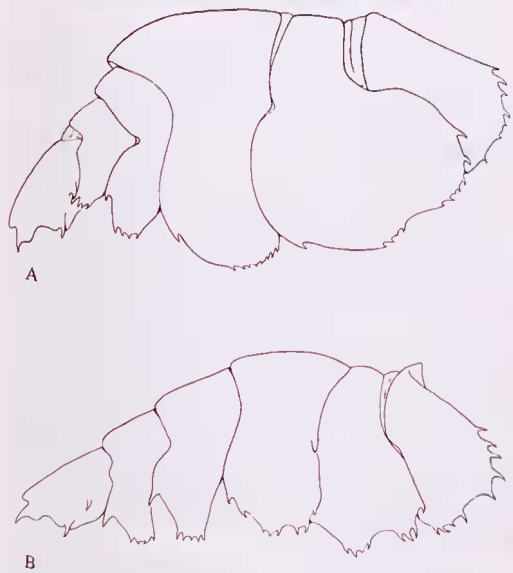


Fig. 3 *Neostylodactylus amarynthi* (de Man), abdominal pleura: A, ovigerous female 3 mm (NTM Cr.006890); B, male 3 mm (NTM Cr.006889).

*Neostylodactylus investigatoris*  
(Kemp, 1925)

*Stylodactylus investigatoris* Kemp, 1925: 260, figs 1,2.

*Neostylodactylus investigatoris* - Hayashi and Miyake 1968: 609; - Chace 1983: 4; - Cleva 1990: 112.

**Material examined.** 1 female, 2 mm, North West Shelf, FRV *Soela*, st. 0183-B04, 19°05.1'S 118°53.4'E, 83 m, 15 February 1983, T. Ward coll., NTM Cr.010908. 1 female (ovig.), 2 mm, FRV *Soela*, st. 2, 19°04.3'S 119°01.1'E, 84 m, 19 April 1983, A.J. Bruce coll., NTM Cr.000432. 1 female, 1.5 mm, FRV *Soela*, st. 0283-B06, 19°04.5'S 118°47.3'E, 83 m, 27 April 1983, T. Ward coll., NTM Cr.010909.

The three specimens examined are in bad condition, two are totally lacking their five pairs of pereiopods, and the third, relatively intact, has been visibly dessicated. But the identification of the latter does not pose any problems, as it corresponds well to the description and the drawings of Kemp, and A. J. Bruce had previously identified it as belonging to this species before me. The rostrum of this specimen (NTM Cr.000432) carries 14 dorsal spines, four of them postrostral (12 dorsal spines in the holotype, 19 in the specimen studied by Hayashi and Miyake), the telson has three pairs of dorsal spines, the dactyls of the last three pairs of pereiopods are slender, those of the third being about 2.5 times and less than 3 times shorter than the propodus.

The telson of the other two specimens also has three pairs of dorsal spines, the rostrum of the largest bears 17 dorsal spines (four of which postrostral), and that of the smallest has a broken tip.

A secondary cornea, small but well marked, can be seen on these three specimens, as Hayashi and Miyake pointed out as being characteristic (1968: 609), on the dorsal face of the peduncle, just behind the main cornea, this last being well developed and well pigmented. It looks as if the ocular peduncle is without the plumose setae present in *N. amarynthi* and *N. affinis* (this is tentative, considering the bad state of the specimens examined); this feature seems to apply also to *N. sibogae* (de Man 1918).

**Distribution.** Mergui Archipelago, 73 m; Straits of Korea, 110 m; north-west Australia, 83 m.

**Genus *Parastylodactylus* Figueira, 1971**

*Parastylodactylus* Figueira, 1971: 3; - Chace 1983: 8; - Cleva 1990: 114.

***Parastylodactylus bimaxillaris* (Bate, 1888)**

*Stylodactylus bimaxillaris* Bate, 1888: 855, pl. 138, fig. 3; - Calman 1939: 188; - Hayashi and Miyake 1968: 599, fig. 5; - Miyake 1982: 25 (*nec* pl. 9, fig. 4 = *Stylodactylus multidentatus* Kubo, 1942).

*Parastylodactylus bimaxillaris* - Chace 1983: 8, fig. 4; - Chan and Yu 1985: 289, pl. I A-D (colour photographs); - Cleva 1990: 114, 115, fig. 11a, 12a.

*Nec Stylodactylus bimaxillaris* - Calman 1925: 16; - Barnard 1950: 652, fig. 122f-h (= *Stylodactylus stebbingi* Hayashi and Miyake, 1968).

*Nec Stylodactylus bimaxillaris* - Miyake 1982, pl. 9, fig. 4 (= *Stylodactylus multidentatus* Kubo, 1942).

**Material examined.** 1 female (ovig.), 8 mm, North West Shelf, FRV *Soela*, st. 0184-69, 14°19.4'S 121°53.4'E, 450 m, 13 February 1984, NTM Cr.006411. 2 females (ovig.), 8-9 mm, FRV *Soela*, st. 0184-110, 16°55.7'S 119°53.1'E, 434 m, 22 February 1984, T. Ward coll., NTM Cr.006885.

These three specimens conform well to earlier descriptions. It should be noted, however, that on the single specimen with an intact rostrum, there are 17 dorsal rostral spines (six on the carapace) and four ventral spines; the first number seems to be the smallest so far noted in this species.

**Distribution.** Known from many areas of the Indo-West Pacific, between 106 and 500 m (Cleva 1990: 118). *Parastylodactylus bimaxillaris* had never before been recorded from Australia.

***Parastylodactylus semblatae* Cleva, 1990**

*Parastylodactylus semblatae* Cleva, 1990: 122, fig. 12c, 14, 18c.

?*Parastylodactylus semblatae* - Hayashi 1991: 123.

**Material examined.** 1 female (ovig.), 6 mm, st. 43-2, off Great Barrier Reef, 17°34.58'S 146°53.21'E, 458-500m, 15 May 1986, CIDARIS 1 (Ref. 353) expedition, NTM Cr.010910.

This specimen, with broken rostrum and telson, has been assigned to this species recently

described from New Caledonia and Chesterfield Islands. Nonetheless, some caution is called for, because of the state of the specimen and also because the merus of the fourth pereopods carries two or three lateroventral spines, unlike all other specimens examined for the original description, which had only a single spine at the level of this segment; this character was integrated in the key for the identification of the species of the genus *Parastylodactylus* (Cleva 1990: 115).

**Distribution.** New Caledonia and Chesterfield Islands (260-630 m), north-east Australia (458-500 m). Hayashi (1991) has recently reported it from Japan (one female from East China Sea, 255 m; one male and two ovigerous females from Taiwan) but his material differs from the original description in:

- the upper margin of the rostrum has a smaller number of spines.
- the ischio-merus of the third walking leg lacks a strong posterior proximal spine.
- the articulation is distinct between the ischium and merus of the fourth walking leg.

These differences, and the figure given by the author, lead me to consider that some confusion has been made with *P. bimaxillaris* (Bate).

**Genus *Stylodactyloides* Cleva, 1990**

*Stylodactyloides* Cleva, 1990: 129.

***Stylodactyloides crosnieri* Cleva, 1990**

*Stylodactyloides crosnieri* Cleva, 1990: 129, figs. 17, 18d-e.

**Material examined.** 1 female, 9 mm, off Great Barrier Reef, Coral Sea, FRV *Soela*, st. 33, 19°55.7'S 151°44.35'E, 357 m, 23 November 1985, A.J. Bruce coll., NTM Cr.004985.

The very particular characters that were used to define *Stylodactyloides crosnieri* and, as a consequence, the new genus *Stylodactyloides*, enabled me to identify this specimen easily. The stylocerite is short and its extremity is widely rounded, the distal lobe of the carpus of the last three pairs of pereopods carries a spine, the mandibular palp consists of a single article, and the antennal scale is long and narrow, with its margins sub-parallel.

The rostral formula of this specimen, 43 dorsal spines (eight on the carapace) and 18 ventral ones, and the ratio of rostrum/carapace lengths (1.9), fit in with the variations noticed in the original description (Cleva 1990: 131). The

external margin of the antennal scale carries 9 and 10 spinules, the merus of the third to fifth pereopods carries respectively 11 and 12, 13, and 12 and 10 strong spines.

**Distribution.** *Styloactyloides crosnieri* has been described from New Caledonia to the Chesterfield Islands, where it was collected between 200 and 415 m. I add north east Australia (357 m). It has recently been reported from New Zealand (five specimens from off the Kermadecs, off North Cape, off the west coast of North Island, and off the west coast of South Island (Yaldwyn 1991: pers. comm.).

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